

November 17, 2004

**CALL FOR SUBMISSIONS (CFS)  
CFS Number 2056DES**

**California Department of Transportation, Division of Engineering Services  
2005-2006 Research Problem Statements and Proposal Guidelines**

**A CONTRACT MAY OR MAY NOT BE AWARDED FROM THIS CFS.**

The Division of Engineering Services (Division) of the California Department of Transportation (Department) is requesting research proposals from public research institutions: colleges, universities, and government agencies that bring practical and innovative solutions to the Department's research problems. The Division's Call for Submissions (CFS) is based on problem statements derived from customer needs. This CFS focuses on the application of solutions to meet the Department's mission of **improving mobility across California**. This research will specifically address the following Department goals:

- **SAFETY:** achieve the best safety record in the nation
- **RELIABILITY:** reduce traveler delays due to roadwork and incidents
- **PERFORMANCE:** deliver record levels of transportation system improvements
- **FLEXIBILITY:** make transit a more practical travel option
- **PRODUCTIVITY:** improve the efficiency of the transportation system

You are invited to review and respond to this **CFS Number 2056DES**, entitled, "**California Department of Transportation, Division of Engineering Services 2005-2006 Research Problem Statements and Proposal Guidelines**". The proposals will be submitted in a two- step process.

- **Step1:** We are requesting **pre-proposals** of about 2-4 pages in length. These pre-proposals will be evaluated by the Department staff.
- **Step 2:** Those respondents who submit successful pre-proposals will be asked to then submit **full-proposals** for their project. Full proposals shall be between 10-20 pages in length.

Please see the schedule in the Pre-proposal and Proposal Submission/Evaluation Process section below. In submitting your documents, you must comply with the instructions found herein. Reference the attached CFS for detailed information regarding:

- I- Background
- II- Research Needs
- III- Pre-proposal and Proposal Format and Content
- IV- Questions and Answers
- V- Pre-proposal and Proposal Submission / Evaluation Process
- VI- General Information
- VII- Problem Statements

If you have questions, the contact person for this CFS is:

Saad El-Azazy, Ph.D., PE,  
Seismic Research Program Manager  
Office of Earthquake Engineering  
Division of Engineering Services  
California Department of Transportation  
Email: saad\_el-azazy@dot.ca.gov

Fax Number: (916) 227-8898

Interested parties should submit electronic documents to:

Saad El-Azazy, Ph.D., PE  
Email: Saad\_el-azazy@dot.ca.gov

This CFS contains the entire terms and conditions relating to the research problem statements, and no other terms, conditions or representations should be considered unless issued in writing as an addendum to this CFS.

- Pre-proposals must be received no later than 5:00PM Pacific Standard Time on **December 29, 2004**
- Proposals must be received no later than 5:00 PM Pacific Standard Time on **February 28, 2005**



## **I-Background**

The California Department of Transportation (Department) is the manager of interregional transportation services; more specifically, the Department has the traditional role of owner and operator of the 15,000 mile State Highway System. The Department promotes California's economic vitality and enhances its citizens' quality of life by providing for the movement of people, goods, services and information. The Department is responsible for the delivery of the State's Transportation Improvement Program; planning, designing, building, operating and maintaining California's state highway systems. In addition to a changing mix of transportation modes such as highways, rail, mass transit, bicycle, pedestrian, and aeronautics, the Department coordinates the solutions to complex issues such as land use, environmental standards, and the formation of partnerships between private industry and local, State and Federal agencies to promote productivity, reliability, safety, flexibility and performance in the State of California. For more information see: [www.dot.ca.gov](http://www.dot.ca.gov)

The Department has developed a new research process guided by the Research and Deployment Steering Committee (RDSC), consisting of Deputy District Director and District Directors. The RDSC, in turn, created Program Steering Committees (PSCs) and Technical Advisory Panels (TAPs) to assist in developing the research agenda and deploying research products.

The functional Division Chiefs lead the PSCs, and senior staff from those Divisions lead the TAPs. The TAPs members can include technical experts from Divisions, Districts and external agencies. The TAPs developed the enclosed problem statements, and will review and rank resulting research proposals. The PSCs and the RDSC will make the final determination on which proposals will become research projects. With this system, the Department hopes to provide more customer participation throughout the research process, and ownership of research products.

## **II- Research Needs**

### **Highlight issues in this CFS are:**

- The CFS is organized according to Division's customers' needs within the Department, including:
  - Issues related to Bridge Structural Design, Bridge Structure Construction, and Bridge Structure Maintenance.
  - Issues related to Geotechnical / Foundation Engineering.
  - Issues related to Earthquake Engineering.
- Respondents should demonstrate how their proposals would benefit the traveling public and contribute to meeting the five Department goals.
- The CFS identifies important problems that need to be solved, but generally does not specify how those problems should be solved. This will allow respondents the flexibility to propose new and innovative solutions.

- Proposals need to be focused toward implementation of their results to improve transportation. In order to facilitate implementation, respondents are encouraged to engage in collaborations with industrial and public agency partners and to consider how the results of their research can be communicated to those who deploy and operate transportation systems (technology transfer).
- In order to promote synergy among diverse research projects, respondents should consider how their projects could be integrated with other research projects, as well as transportation planning and deployment projects, in specific California regions or corridors.
- Department staff will work with the proposal authors to strengthen the project's implementation effectiveness and to facilitate their integration with other new and ongoing research, planning and deployment projects.
- Multi-disciplinary and multi-campus research teams are encouraged in order to integrate diverse research capabilities.

### **III- Pre-Proposal and Proposal Format and Content**

#### **Two -Step Process**

The first stage of the proposal process will be the pre-proposal. Within 30 days of the pre-proposal submittal deadline, successful respondents will receive a request to submit a formal, detailed proposal or notice declining interest in the pre-proposal. The respondent may also receive comments from Department personnel for purposes of technical clarification of the proposed effort. The second stage of the process will be the proposal, which shall be from 10-20 pages single-spaced (excluding appendices).

#### **Step 1: Pre-Proposal**

##### **Pre-Proposal Format and Content**

The pre-proposal will consists of 2-4 pages, and will include a project plan summary, estimated budget/resource plan and research team. Proposers should include the identification number of the problem statement to which you are responding, project title, the name of the entity submitting the proposal and all project partners. The following general outline for the body of the pre-proposal should be followed.

##### **Project Plan Summary**

- Brief summary of the problem, and how proposed research would contribute to solving the problem;
- Method of approach to the problem;
- Anticipated deliverables;
- Preliminary schedule and milestones;

- Steps to implementation, including additional research phases (if required) and a preliminary timeline for the final product.

### **Estimated Budget**

Each pre-proposal must include an estimated yearly and total budget including proposed number and type of personnel and man-hours of effort and major equipment proposed for purchase.

### **Research Team**

Describe previous experience and training in relevant areas of research (one-two paragraphs). When relevant, highlight the contribution of research collaborations (across disciplines and campuses or with private sector) to the project. Brief curriculum vitae/resumes of the PI and key personnel may be included as attachments.

## **Step 2: Full Proposal**

### **Proposal Format and Content**

The full proposal should address each of the items requested in the pre-proposal in additional detail, as well as addressing comments and concerns resulting from the pre-proposal screening. The body of the proposal will be limited to twenty (20) pages at the maximum, not including curriculum vitae.

Each proposal, including curriculum vita (e), budget, timeline and cover page, must either be in a single file, in either PDF or Word format (no zipped files). Research proposals should provide a detailed description of the research to be undertaken. The following general outline for the body of the proposal should be followed:

#### **Cover Page**

The cover page must include the date, problem statement number, proposal title, lead researcher(s) name and affiliation, key supporting researcher(s) name and affiliation, project budget for each fiscal year and a total budget. Note that the state fiscal year ends June 30.

#### **Summary**

- One paragraph summary of the problem statement, significance of research contribution, and contribution of research to problem statement.
- One or two paragraph summary of the research plan, deliverables, research contribution to solving specific transportation problems, and how the final research product can be implemented to solve California's transportation problems.

## **Background/Business Case**

- Review related/complementary research completed or underway in the problem area (literature search).
- State project scope, objectives, and motivation, in light of the Department's goals.
- Describe the impact of the proposal on the existing transportation issue/problem/need.
- Identify the anticipated customers/users.
- Explain how this project will improve transportation system safety, efficiency or effectiveness in the short or long term
- Address what makes this research project essential to the improvement of California's transportation system
- Address the consequences for Caltrans and its customers if the problem/opportunity is not addressed.

## **Research Outcome**

- Describe the outcome of this research in terms of next steps; will the outcome result in a product that is usable by the practitioner? If not, what further research or additional activities would be required to reach that point? Provide a preliminary timeline for the final product. Be as specific as possible. The Department is looking for applied research and results.
- Provide a benefit/cost assessment, which shows the economic benefits that will be derived for the ultimate product which is the subject of the work.

## **Methodology**

- Explain the proposed research methods in sufficient detail to enable evaluation of feasibility, originality and significance of the proposal. If appropriate to the content of the proposal, describe the current technology that is the subject of the proposal. If the research project involves selection of a specific technology solution from among multiple alternative approaches, explain the reasoning behind that selection.
- Describe the alternatives
- Identify the alternative that best satisfies the objectives
- Explain why the selected solution was picked over the other alternatives

## **Research Plan and Deliverables**

Provide a research plan with specific tasks, milestones and deliverables. Deliverables should be described precisely and in depth, and should be clearly related to the methodology. The proposal should indicate how staff would be assigned by task.

Multi-partner proposals should clearly identify which party is responsible for each task. Quarterly progress reports/meetings are required for all projects, regardless of the duration of the project, and every project must have a final report.

## **Timeline**

Provide a detailed list of project tasks and the duration of each task in a Gantt chart format, including significant milestones and deliverables.

### **Budget**

A detailed budget for the proposed work is required. Budget categories must include at minimum: number and type of personnel, equipment, supplies & expenses, travel, and overhead. Furthermore, each equipment item must be specifically identified. All overhead type of expenses must also be detailed and justified; e.g., benefit rates, etc. Please note that in addition to the total proposed budget, a breakdown by category is required for each fiscal year, which runs from July 1 to June 30.

### **Research Team**

Describe previous experience and training in relevant areas of research (one-two paragraphs). When relevant, highlight the contribution of research collaborations (across disciplines and campuses or with private sector) to the project.

### **Curriculum Vitae**

A detailed resume of the lead researcher(s) as well as brief resumes of all other researchers.

**At the conclusion of the project, the researcher(s) will deliver a final report and present his/her research results to Caltrans in a workshop forum, including a full explanation of the applied usefulness of the research.** This may be done as a single-topic workshop or bundled with other related topics.

## **IV- Questions and Answers**

Respondents with questions about the requirements of this CFS must submit those questions in writing to the email address shown below, and by the dates referred to in **Schedule**. Question submittal must include the individual's name, the name and address of the research institution. Questions will be received and answered electronically by:

Saad El-Azazy, Ph.D., PE  
Email address: saad\_el-azazy@dot.ca.gov

## **V- Pre-Proposal and Proposal Submission/Evaluation Process**

### **Pre-proposal and Proposal Submittal, Modification, Resubmittal, and Withdrawal**

Pre-proposals and proposals should be e-mailed, with the CFS# and Problem Statement # must be in the subject line, and Project Title and Respondent's Name/Research Institution must be in the email text. Respondents are to submit proposals to:



Saad El-Azazy, Ph.D., PE at Saad\_El-Azazy@dot.ca.gov

Respondents submitting pre-proposals or proposals may modify or withdraw the proposal at any time prior to the submittal deadline. Such modification or withdrawal of a proposal shall be in writing and submitted by the same person submitting the original proposal.

If the modification requested is only an addition to a pre-proposal or proposal, an e-mailed addition shall be boldly marked “Addition To (Problem Statement # and project title)” addressed the same as the original proposal.

## **Evaluation Process**

The pre-proposal selection will be made by the Department's Technical Advisory Panels (TAPs). Pre-proposals will be screened against the basic evaluation criteria below. Authors of successful pre-proposals will be asked to submit a full proposal.

The proposal evaluations will be completed by the Department's Technical Advisory Panels (TAPs) and Program Steering Committees (PSCs). Final selection will be made by the Department's Research and Deployment Steering Committee. Proposals will be screened against the evaluation criteria below.

## **Pre-proposal Evaluation Criteria**

- Responds well to problem statement
- Meets Department goals and objectives
- Cost is reasonable
- Likely to be successfully implemented in the Department practices

## **Proposal Evaluation Criteria**

- Responds well to problem statement and meets Department goals and objectives
- Comprehensive Literature Search completed
- Utility of research outcome: When will the ultimate product that is the subject of the research is available and is it likely to be deployed? What benefit (economic or other) will the project provide?
- Research objective: Are the stated objective, scope and motivation clear, valid, and logical?
- Methodology: Are the plans, methods, techniques and procedures feasible, clear, valid, adequately referenced, and state-of-the-art?
- Qualifications: Are the qualifications, capabilities, and experience of the proposed lead researcher and other key personnel sufficient to achieve the proposed objectives? If applicable, is proposed facility adequate for proposed work?

- Budget: Does the budget reflect the actual needs of the proposed work? Have the requests for personnel, equipment, supplies, etc. been fully justified?

### **Acceptance and Rejection of Submissions**

The Department/Division retains the right to disregard a minor deviation from the requirements and may, at its sole discretion, request supplemental information or clarification of that information submitted.

### **Negotiations with Selected Proposer**

Once a full proposal is submitted, the Department/Division may elect to negotiate with the selected respondent, leading to a written Agreement with the Department/Division about implementing the proposal. Any agreement as a result of this CFS will be subject to all necessary State, Federal and Agency approvals. If an agreement cannot be reached, negotiations will cease and no contractual agreement written or implied will exist. The Department/Division will not reimburse submitting organizations for any costs incurred in the preparation or submission of pre-proposals or proposals, or in the negotiation process.

This CFS shall not commit the Department/Division to negotiate and execute any Agreement. The Department/Division reserves the right to accept proposals that, in the sole judgment of the Department/division, are in the best interest of the State and regions. The Department/Division reserves the right to reject any or all proposals or to modify or cancel, in part or in its entirety, this CFS.

## **VI- General Information**

### **Confidentiality**

Proposal submittals are confidential. Selection committee members shall discuss the evaluation proceedings and content of proposals only with Department/Division staff and with members of the selection committees. Proposals that are not selected will not be reprinted or used for purposes not pertaining to this CFS process. Information on proposals that are selected will not be released until a contract is in place.

### **Budget Issues**

1. The state fiscal year runs from July 1 to June 30.
2. All proposed research projects shall use an assumed start date of October 1, 2005 or later when preparing budget and schedule projections and estimates.
3. Any funding changes between the pre-proposal and proposal must be justified in the Budget section of the proposal.

### **Amendments to the Requested Proposal**

The Department/Division reserves the right to amend this CFS by addendum prior to the final date of proposal submission.

### **Schedule**

The schedule related to this CFS is as follows:

<b>EVENT</b>	<b>DATE</b>
CFS available to prospective Respondents	November 17, 2004
Pre-proposal Written Question Submittal Deadline	December 6, 2004
Responses to Questions	December 10, 2004
<b>Final Date for Pre-proposal Submission</b>	<b>December 29, 2004</b>
Completion of Pre-proposal Evaluations*	January 28, 2005
Proposal Written Question Submittal Deadline	February 22, 2005
Responses to Questions	February 25, 2005
<b>Final Date for Proposal Submission</b>	<b>February 28, 2005</b>
Proposal selection	May, 2005

\* By this date all respondents will be notified if their proposal has been selected for development into a full proposal.

## **VII- Research Problem Statements**

The following is a list of problem statements:

<b>FY05/06 Research Problem Statements</b>	
04-EQ003	Determine the Seismic and Service Load Response of "Skewed" Post-Tensioned, Concrete Box-Girder Bridges To Improve Safety and Reduce Impacts To Traffic
04-EQ011	Evaluation of the Long Term Performance of Epoxy Bonded Mechanical Couplers
04-EQ012	Development of Accessible Hinge Details For Box Girder Bridges
04-EQ017	Emergency repair of damaged bridge columns using Fiber Reinforced Polymer (FRP) materials.
04-EQ026	Determining the Effective System Damping of Highway Bridges
04-EQ042	Determining the Live Load Capacity of Bridges Designed to Caltrans Seismic Design Criteria Following a Major Seismic (Design) Event
04-EQ082	Development of Seismic Design Guidelines for Segmental Construction
04-EQ089	Guidelines for the Seismic Design of Steel Girder Bridge Superstructures
04-EQ091	Detailing Requirements to Ensure Adequate Plastic Hinge Ductility of Columns Subject to Torsional Seismic Loading
04-EQ092	Testing of Pile Extension Connections to Slab Bridges
04-EQ096	Determining the Effects of Low Cycle Fatigue on the Seismic Performance of Rebar And Couplers For Critical Structural Members
04-EQ104	Verification of Computer Analysis Models for Suspension Bridges
04-GS004	Shortening Closure Pour Waiting Time for Bridge Construction
04-GS023	Improved Design and Construction Specifications to Minimize Bridge Deck Rehabilitation and Maintenance Costs
04-GS039	Develop and Assess Post-Grouting Methods to Increase the Load Capacity of Deep Foundations
04-GS040	Reducing Shrinkage Cracking in Concrete Bridge Decks
04-GS045	Development of Reliable Methods to Analyze Battered Piles in Layered Soils and Piles in Sloping Ground to Reduce Foundation Cost
04-GS048	Evaluation of Hollow Bar Soil Nail Systems for Excavation Reinforcement
04-GS064	Non-Destructive Evaluation of Fiber Reinforced Polymer (FRP) Composite Bridge Decks
04-GS065	Improving Excavatable Flowable Backfill with Recycled Materials
04-GS068	Establishment of Updated Lumber Stress Values to Enhance the Safety and Reliability of Bridge Falsework
04-GS070	Development of a Maintenance Monitoring Program for Earth Retaining Systems
04-GS083	Determining Methods to Control the Effects of Heat of Hydration and Other Concerns Associated with the Placement of Mass Concrete for Cast-in-Place Concrete Piling
04-GS093	Development of an Automated Vertical Clearance Measuring Device for Highway Structures
04-GS094	Health monitoring to detect failure of prestressing (PS) cables in segmental box-girder bridges
04-GS108	Validating the Durability of Corrosion Resistant Mineral Admixture Concrete
04-GS120	Development of Specifications to Minimize Construction Induced Ground Vibration Damage to Nearby Structures